Oct. 21, 1941. A. A. KUCHER 2,260,145

REFRIGERATING APPARATUS

Filed Oct. 18, 1939 2 Sheets-Sheet 1

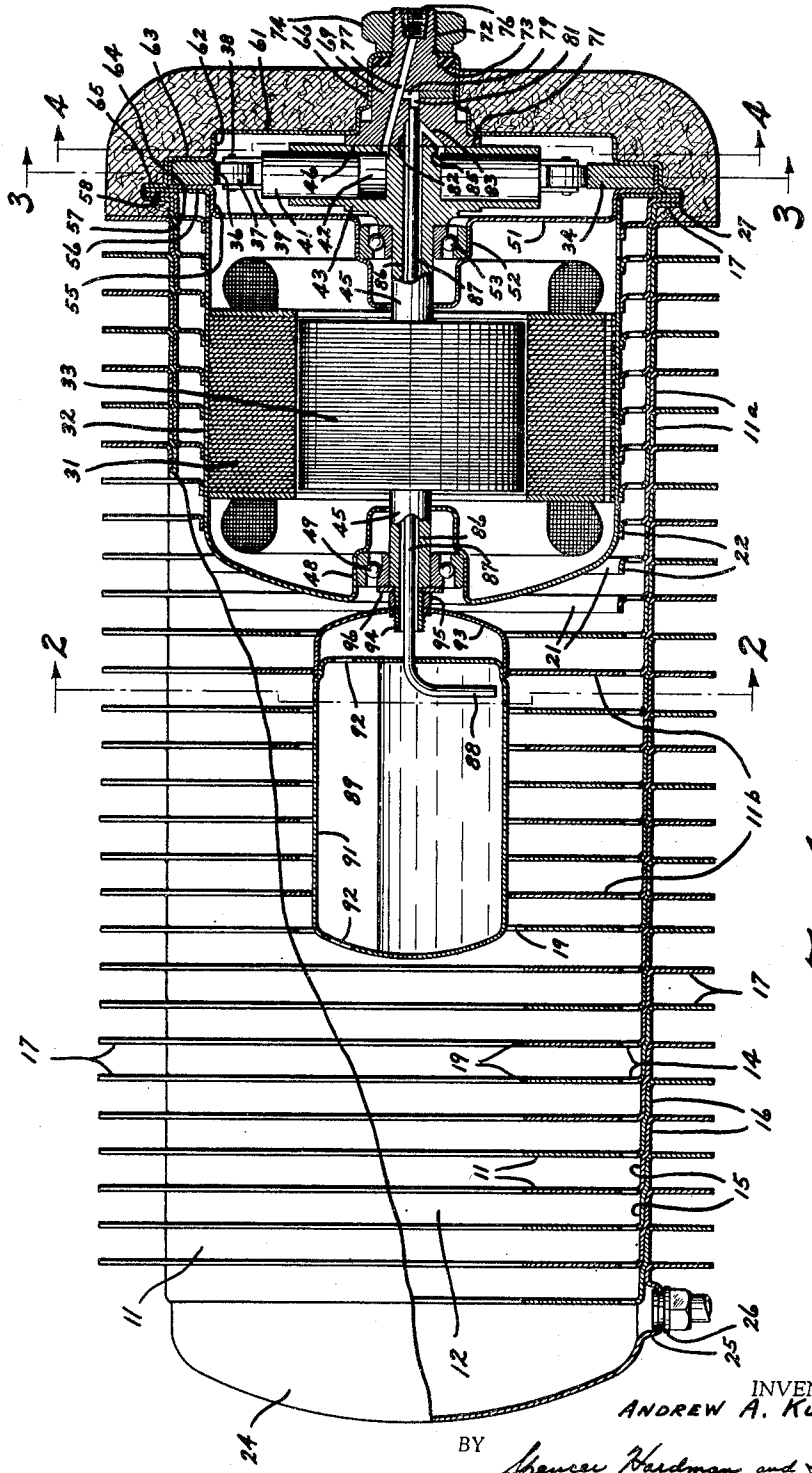


Fig. 1

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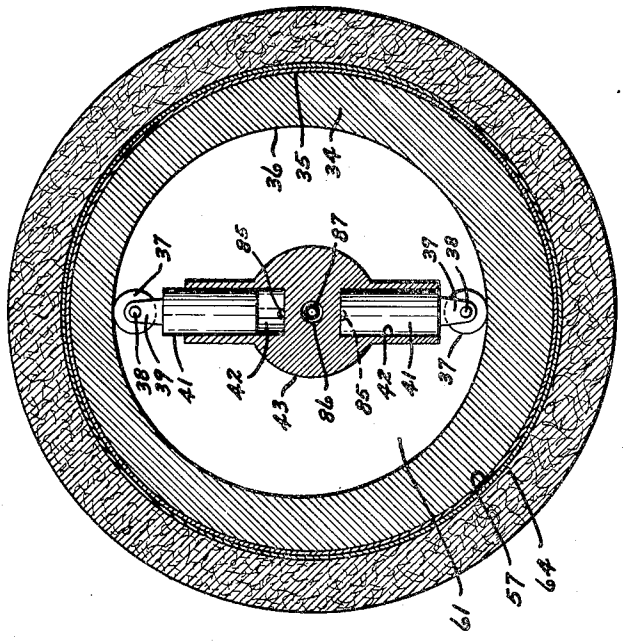


Fig. 3

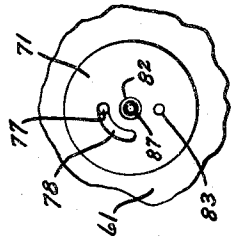


Fig. 4

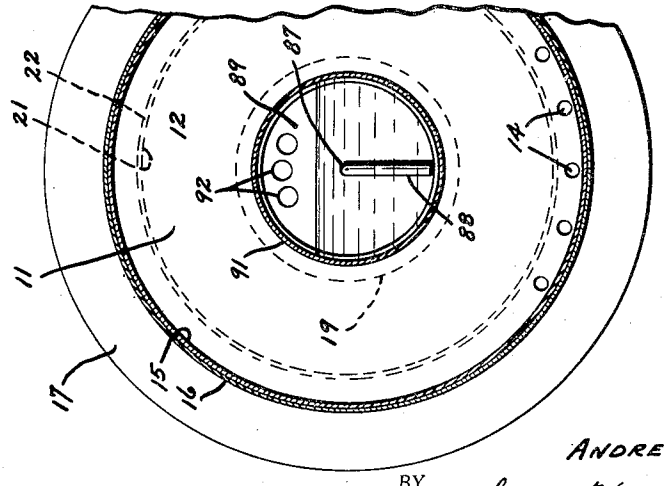


Fig. 2

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Patented Oct. 21, 1941 2,260,145

UNITED STATES PATENT OFFICE

2,260,145

REFRIGERATING APPARATUS

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Application October 18, 1939, Serial No. 300,031

11 Claims. (Cl. 62—115)

This invention relates to refrigerating apparatus and particularly to a motor-compressor unit for a refrigerating system.

An object of my invention is to reduce the number of elements employed to form the high pressure side or portion of a closed refrigerating system.

Another object of my invention is to provide an improved combined motor-compressor-condenser-receiver structure.

A further object of my invention is to provide a combined motor-compressor-condenser-receiver structure constructed substantially in its entirety of sheet metal punchings or stampings.

A further object of my invention is to construct a combined motor-compressor-condenser-receiver unit for a refrigerating system from a plurality of cup-shaped sheet metal members and to provide the members with an integral portion which extends laterally from walls of the unit to provide radiating fins for transferring heat from the interior of the unit to atmosphere exteriorly thereof.

In carrying out the foregoing objects, it is a still further and more specific object of my invention to provide a unitary motor-compressor-condenser-receiver structure wherein provision is made for separating lubricant from refrigerant compressed by the compressor to insure proper lubrication of operating parts thereof and in which structure provision is made for removing heat from the compressor and from the refrigerant compressed thereby.

Further objects and advantages reside in the cooperation of parts of the structure which facilitates the manufacture and assembly of my combined unit and in novel combinations and arrangements to provide an efficient unit of low manufacturing costs as will more fully appear in the course of the following description.

In the drawings:

Fig. 1 is a vertical transverse sectional view of a combined unit constructed in accordance with my invention;

Fig. 2 is a vertical sectional view taken on the line 2—2 of Fig. 1 of the oil separator of the unit more in detail;

Fig. 3 is a vertical sectional view through the unit taken on the line 3—3 of Fig. 1 showing the compressor portion of the unit; and

Fig. 4 is a fragmentary vertical sectional view taken on the line 4—4 of Fig. 1 showing a plate having refrigerant inlet and outlet ports which communicate with the compressor cylinders of the unit.

Referring to the drawings, for the purpose of illustrating my invention, I have shown in Fig. 1 thereof a horizontally disposed structure providing a combined motor-compressor-condenser-receiver unit. This unit includes a plurality of vertically disposed cup-shaped metal members 11 stamped or punched from sheet metal and unidirectionally nested and secured together to form a horizontal or elongated chamber 12. Each of the punched or stamped members 11 has a plurality of spaced apart holes 14 provided therein near the bottom of the unit and each member 11 is also provided with a wall portion 15 and a slightly larger diametered wall portion 16 formed by a shoulder therebetween. Each member 11 also has an integral flanged portion 17 extending outwardly from the wall 16 thereof to provide the structure with radiating fins for effectively removing heat from the interior of the unit and transferring this heat to atmosphere exteriorly thereof. Members 11 are stacked upon each other so that the larger diametered wall portion 16 of one member fits or telescopes over the wall portion 15 of an adjacent member. The shoulder between wall portions 15 and 16 of members 11 forms a stop for the stacking or nesting of the members to thereby space the vertical extending portions of the members a predetermined distance apart. Members 11 located at one end of the unit are each provided with a center aperture 19 and a plurality of members 11*a* at the opposite end of the unit are each provided with a larger opening 21, the wall of which is formed by an integral bent or flanged portion 22. A plurality of members 11*b*, intermediate certain of the members 11, are each provided with a central opening which is smaller in diameter than the aperture 19. The aperture 19 in members 11 and walls of the openings in members 11*a* and 11*b* are for a purpose to be hereinafter described. A cap or cup-shaped closure member 24 is placed over the end member 11 and this closure member is provided with a depressed portion 25, located at the bottom of the horizontally elongated unit, and has a pipe connector 26 welded or otherwise suitably secured thereto. The two members 11*a* at the opposite end of the unit have their integral flanged or finned portions 17 cut off, as at 27, so as to be of smaller diameter than the fin portions of the remainder of the members 11 for a purpose to be made apparent hereinafter.

The motor of the motor-compressor-condenser-receiver unit includes a motor stator 31 tightly pressed into or otherwise secured to the inner

wall surface of a sheet metal housing 32 and a motor rotor 33. Wires leading from the exterior of the unit to windings of the motor stator 31 may be insulated from and sealed to the wall of the unit in any conventional or desirable manner in order to conduct electric current to the motor stator. The compressor of the unit comprises a heavy metal ring 34 having a cylindrical outer surface 35 (see Fig. 3) disposed concentric with the longitudinal axis of the unit and provided with an inner cylindrical surface 36 disposed eccentrically relative to the longitudinal axis of the unit. A pair of rollers or the like 37 are adapted to roll upon or against the inner surface 36 of ring 34. Each roller 37 is secured, by a pin 38, to legs 39 provided on piston members 41 which are adapted to be reciprocated in cylinders 42 formed in a cast metal element 43. Element 43 is provided with an integral shaft portion 45 extending outwardly from one side thereof perpendicularly with respect to the extension of the cylinders 42 and is also provided with a finished plane surface 46 on the other side thereof. Motor rotor 33 is pressed or otherwise suitably and rigidly mounted upon the shaft portion 45 of element 43. The cupped end of sheet metal motor housing 32 is provided with a centrally located depression 48 having a bearing 49 therein which receives the outer end of shaft portion 45 of element 43. A plate 51 is provided with a central depression 52 having a bearing 53 therein which receives the shaft portion 45 adjacent element 43, and this bearing 53 abuts against a shoulder formed on the element 43. Plate 51 has outer flanged wall portions 55, 56 and 57 and the sheet metal motor housing 32 has a flange 58 formed outwardly from its motor housing forming wall. The horizontal wall portion 55 receives the wall of housing 32 with the vertical flanged part 58 of the housing engaging the wall portion 56 of plate 51. The wall portion 57 of plate 51 fits over the outer surface 35 of ring 34 and this ring abuts against the vertical wall portion 56 of plate 51. Another plate 61 is provided with outer flanged wall portions 62, 63, 64 and 65 and has a cup-shaped central depression 66 formed therein. The vertical wall portion 63 of plate 61 abuts against the ring 34 and horizontal wall portion 64 thereof receives and engages the wall portion 57 of plate 51 while its vertical wall portion 65 engages and is secured to wall portion 58 of the motor housing 32. Cutaway flanges 17 of members 11*a*, as at 27, and the outer edges of wall portions 58 and 65 of plates 51 and 61 respectively are welded or otherwise suitably secured or sealed together. The cupped depression 66 of end plate 61 has disposed therein a metal member 69 provided with a finished plane inner surface 71 which engages the plane surface 46 of element 43. Member 69 is also provided with a threaded portion 72 which extends through the opening in the end of the depression 66 of plate 61. A washer 73 preferably of a resilient material is located between a shoulder formed on member 69 and the end wall part of depression 66 of plate 61. Washer 73 is tightly compressed between the shoulder of member 69 and the end portion of depression 66 to seal the point of extension of portion 72 of member 69 through plate 61. A nut 74 is threaded upon the threaded portion 72 of member 69 to compress washer 73 and rigidly lock member 69 against rotation relative to plate 61. Member 69 has a threaded pipe connection 76 formed in its outer end and has an angularly disposed bore 77 extending from this pipe connection to the plane face 71 thereof. The bore 77 in member 69 is elongated as at 78 (see Fig. 4) for a purpose to be hereinafter described. Member 69 is further provided with a short vertical bore 79 which communicates with a short horizontal central bore 81 and these short bores 79 and 81 are preferably of a smaller diameter than the bore 77. An enlarged central bore 82 in member 69 communicates with a short angular bore 83 therein which also extends to the plane face 71 of member 69.

Each of the pair of cylinders 42 has a porthole 85 extending through a wall of the cylinder and adapted to communicate, when element 43 is rotated, with the bores 77 and 83 provided in member 69. Element 43 is also provided with a horizontal bore 86 which extends entirely through the shaft portion 45 thereof and communicates with the bore 82 in member 69. A tube 87, having a small inner diameter corresponding substantially to the small diameter of bores 79 and 81, is disposed in and extends through the central bore 86 of element 43. Tube 87 has its one end rigidly secured in sealing engagement with the wall of bore 81 in member 69. The opposite end 88 of tube 87 projects beyond the inner end of shaft 45 and is bent downwardly toward the bottom of a compartment or chamber 89. Compartment or chamber 89 is formed by a sheet metal casing 91 and has a plurality of openings 92 (see Fig. 2) in its end walls. A cup-shaped member 93 is fitted over and secured to one end of casing 91. Member 93 has an opening centrally thereof through which the threaded end portion 94 of shaft 45 projects in order to conduct or direct refrigerant from the passage or bore 86 to the interior of member 93. Member 93 abuts against a nut 95 which is threaded upon the threaded end 94 of shaft 45 and which nut is backed by a washer 96 which engages the bearing 49 to maintain the bearing in position within the depression 48 of casing 32. The central opening in member 93 is of sufficient diameter to permit the threaded end 94 of shaft 45 to freely rotate therein relative to the casing 91. The wall of the central opening in each of the punched members 11*b* tightly engages the casing 91 to prevent rotation thereof and to support same within the unit while the flanged walls 22 of openings 21 in members 11*a* engage the motor housing 32 to support the motor from members 11 axially within the unit. A mass of cushioning material may be placed around the compressor end of the unit to prevent damage or misalignment of parts of the unit upon striking other objects during assembly and/or shipment of the unit. This cushioning material is preferably of a sound absorbing character so as to minimize the transfer of audible noises of the compressor to the exterior of the structure.

In assembling the unit disclosed, the plurality of cup-like sheet metal members 11 are unidirectionally superimposed one upon another until a stack of predetermined height or length is obtained. The end closure member 24 is then placed upon the end member 11. The stacked members 11, 11*a* and 11*b* may then be inserted as a unit into a hydrogen brazing furnace and the wall portions 15 and 16 thereof brazed together with any suitable brazing material as is well known in the brazing art. Parts of the motor-compressor portion of the unit are separately assembled and secured together and may then be inserted into the elongated chamber

formed by the stacked and brazed together members 11. The casing 91, motor housing 32, plate 51 and element 43 together with its pistons 41 and ring 34, all of which are preferably secured together as a subassembly, may then be inserted into the chamber formed by the stacked members 11. The flanged walls 22 of openings 21 and walls of the opening in members 11b serving to guide and facilitate the insertion of the subassembly into the stack of members 11 and provide axial alignment and support of the casing 91 and motor-compressor portion of the unit. Thereafter, the plate 61, with member 69 secured thereto, is placed over the end of the unit with its vertical wall portion 65 abutting the vertical wall portion 58 of motor housing 32. This brings or positions the face 71 of member 69 into contact with the plane surface 46 of element 43, and thereafter the wall portion 58 of housing 32 and wall portion 65 of plate 61 are welded about their peripheral edges to the cut-off edges 27 of the members 11a to seal the structure and provide a unitary construction. Thus, the sealed unit forms a combined motor-compressor-condenser-receiver structure.

In operation, the motor is continuously energized to cause continuous rotation of the motor rotor 33 and consequently shaft 45 substantially in the manner disclosed in my Patent No. 2,178,020, dated October 31, 1939. Shaft 45 being integrally formed with element 43 causes continuous rotation of the element 43 about the axis of the unit. The centrifugal action created by rotation of cylinders 42 with element 43 forces the pistons 41 outwardly from the cylinders away from the axis of the unit and thereby causes the rollers 37 to bear against the eccentrically disposed or located inner cylindrical surface 36 of ring 34. The rollers 37 in following the contour of the inner surface 36 of ring 34, during rotation of element 43, causes the pistons 41 to reciprocate within their cylinders 42. Member 69 is, of course, held stationarily with plate 61 by the clamping nut 74 and the plane surface 46 on element 43 thus rotates around and against the plane face 71 of member 69. The parts are so arranged with respect to one another that rotation of element 43 brings the port 85 of one cylinder 42 into communication with the inlet bore 77 through elongated port 78, while its piston 41 is moving outwardly of its cylinder 42, to thereby create a suction within the cylinder which draws evaporated or gaseous refrigerant into the said cylinder. This gaseous refrigerant is withdrawn from an evaporator of a closed refrigerating system (not shown), of which the present unit forms a part, to cause the evaporator to produce a refrigerating effect. At the time porthole 85 in this one cylinder registers with the refrigerant intake bore 77, the piston in the other or opposite cylinder has compressed the refrigerant and the porthole 85 in this opposite cylinder registers with the bore 83. The compressed refrigerant is discharged from the opposite cylinder into the central longitudinal bore 86. Obviously, the one cylinder and its piston will, upon being rotated into the position described with respect to the other or opposite cylinder, compress and discharge the refrigerant previously drawn thereinto while the other cylinder is drawing in refrigerant gas. The compressed refrigerant discharged from the cylinders into the bore 83 and bore 86 flows, between tube 87 and the wall of bore 86, to the open threaded end 95 of shaft 45. Refrigerant flowing from the open end 95 of shaft 45 is direct, through cap 93, by holes 92 in casing 91, into the compartment or chamber 89. The baffling and change in direction of flow of the compressed refrigerant, afforded by the end wall of casing 91 and openings 92 therein, together with the reduced speed of travel of the compressed fluid causes lubricant to separate out of the compressed refrigerant and drop into the compartment or chamber 89. The separated oil may accumulate in compartment 89 up to any desired level and the separated refrigerant flows out of compartment 89, through holes 92 in the opposite end of casing 91, and into the longitudinal condensing chamber 12 of the unit formed by the members 11. The compressed refrigerant within chamber 12 is cooled and liquefied and drops to the bottom thereof from where it flows through the holes 14 in members 11 to the liquid refrigerant outlet of the unit formed by pipe connector 26. A pipe connected to the connector 26 may convey the cooled liquefied refrigerant back to the evaporator of the closed cycle refrigerating system.

It is, of course, desirable and essential to lubricate operating parts of the unit and for this reason oil separated from the compressed refrigerant and contained in compartment 89 is conveyed, by pipe 87, to bores 81 and 79 and into bore 77 of member 69. Since the inner diameter of tube 87 and the diameter of bores 79 and 81 are small, relative to the diameter of bore 77, these pasages provide a substantially capillary orifice communication between the separator 91 and the suction side of the system. The amount of oil flowing from separator 91 to the cylinders 42 is therefore restricted, by this substantially capillary orifice communication, to such a degree that only sufficient oil flows into the cylinders for lubricating purposes. Each time a porthole 85 registers with the bore 77, to establish communication between the evaporator of the refrigerating system and a cylinder 42, a small amount of oil is drawn into the cylinder along with evaporated or vaporized refrigerant. The separated oil circulated through the unit by the compressor along with refrigerant clings to walls of portholes 85 and during their rotation flows therefrom, by capillary attraction, onto the plane surface 46 of element 43 and onto the plane face 71 of member 69 to thereby lubricate these plane surfaces during rotation of surface 46 relative to face 71. The oil lubricates the pistons and cylinders and also finds its way to rollers 37, pins 38 and the inner surface 36 of ring 34 to lubricate these operating parts. Oil which leaks past the pistons may accumulate in the compressor portion of the unit between the plates 51 and 61 to further lubricate the plane bearing surfaces 46 and 71, rollers 37, pins 38 and the one bearing 53. The oil accumulated in the compartment between the plates 51 and 61 may flow from this compartment through bearing 53, along shaft 45 and through the opening in plate 51 for shaft 45 to the interior of the motor housing 32. This oil then drops to the bottom of the interior of housing 32 and is directed, by a hole in its lowermost portion, into one end of the condensing chamber 12 where it flows, through openings 14 in members 11, along with liquid refrigerant back to the evaporator. Bearing 49 is lubricated by oil co-mingled with refrigerant gas contained in chamber 12.

From the foregoing, it will be apparent that I have eliminated the provision in a refrigerating

system of a plurality of separate elements forming the high pressure side thereof, and by constructing a combined motor-compressor-condenser-receiver unit a refrigerating system is greatly simplified. My improved combined unit is constructed with a minimum of machined parts to thereby reduce costs of manufacturing such a unit and to facilitate assembly of the parts thereof. By constructing the condenser-receiver portion of the unit of sheet metal stampings or punchings and providing these sheet metal members with integral flanged finned parts extending outwardly from walls of the chamber, I provide ample heat radiating surfaces which effectively transfer heat from the compressed refrigerant to atmosphere externally of the unit to thereby efficiently cool and liquefy the compressed refrigerant gases. By causing separation of oil from the compressed refrigerant with the separating device illustrated and in the manner described, I have provided a novel oiling system for operating parts of the unit. The oil is collected separate from the refrigerant and is substantially isolated therefrom to thus insure a richer mixture of oil for lubricating purposes.

While the form of embodiment of the invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. A combined motor-compressor-condenser-receiver for a closed refrigerating system comprising in combination, a plurality of unidirectionally nested cupped members secured together to form a sealed unitary structure, a portion of said members inwardly of the secured-together cupped portions thereof being perforated to provide an elongated chamber within said structure, a compressor within said chamber, a motor within said chamber having a rotor directly connected to said compressor for operating same, the wall of the perforation in each of certain of said members engaging said motor and supporting same axially within said chamber, means for conducting refrigerant fluid from the exterior of said sealed structure to said compressor and means for directing refrigerant from said compressor to said chamber, said members having each an integral portion extending laterally from the cupped portion thereof and providing said structure with a plurality of radiating fins, said certain members being in intimate heat exchange relation with said motor for transferring heat therefrom to atmosphere exteriorly of said structure, and other of said members being in intimate heat exchange relation with refrigerant in said chamber for cooling and liquefying same therein.

2. A combined motor-compressor-condenser-receiver for a closed refrigerating system comprising in combination, a plurality of unidirectionally nested cupped members secured together to form a sealed unitary structure, a portion of said members inwardly of the secured-together cupped portions thereof being perforated to provide an elongated chamber within said structure, a housing within said chamber enclosing a motor, a compressor within said chamber, said motor having a rotor directly connected to said compressor for operating same, the wall of the perforation in each of certain of said members engaging said housing for supporting same axially within said chamber, means for conducting refrigerant fluid from the exterior of said sealed structure to said compressor and means for directing refrigerant from said compressor to said chamber, said members having each an integral portion extending laterally from the cupped portion thereof and providing said structure with a plurality of radiating fins, said certain members being in intimate heat exchange relation with said housing for transferring heat from said motor to atmosphere exteriorly of said structure, and other of said members being in intimate heat exchange relation with refrigerant in said chamber for cooling and liquefying same therein.

3. A horizontally disposed combined motor-compressor-condenser-receiver for a closed refrigerating system comprising in combination, a plurality of unidirectionally nested cupped members secured together to form a sealed unitary structure, a portion of said members inwardly of the secured-together cupped portions thereof being perforated to provide an elongated chamber within said structure, a compressor within said chamber, said compressor including an element having oppositely disposed cylinders formed therein and extending perpendicularly to the axis of said horizontally elongated chamber, said compressor element having an integral shaft portion extending therefrom along the axis of said chamber, a motor within said chamber having a rotor mounted on said shaft portion of said compressor element for rotating same, a housing within said chamber for said motor, said housing having bearings mounted therein receiving said shaft portion of said compressor element for supporting same axially of the structure, a piston within each cylinder of said element, a ring surrounding said element and having a cylindrical inner surface disposed eccentric to the axis of rotation of said element, said pistons engaging said eccentric inner surface of said ring during rotation of said element for reciprocating the pistons in their cylinders, means for conducting refrigerant fluid from the exterior of said structure to said compressor and means for directing refrigerant from said compressor to said chamber, and said members having each an integral portion thereof extending outwardly from the wall of said chamber for transferring heat from the interior of said chamber to atmosphere exteriorly of said structure.

4. A horizontally disposed combined motor-compressor-condenser-receiver for a closed refrigerating system comprising in combination, a plurality of unidirectionally nested cupped members secured together to form a sealed unitary structure, a portion of said members inwardly of the secured-together cupped portions thereof being perforated to provide an elongated chamber within said structure, a compressor within said chamber, said compressor including an element having oppositely disposed cylinders formed therein and extending perpendicularly to the axis of said horizontally elongated chamber, said compressor element having an integral shaft portion extending therefrom along the axis of said chamber, a motor within said chamber having a rotor mounted on said shaft portion of said compressor element for rotating same, a housing within said chamber for said motor, said housing having bearings mounted therein receiving said shaft portion of said compressor element for supporting same axially of the structure, a piston within each cylinder of said element, a ring surrounding said element and having a cylindrical inner surface disposed eccentric to the axis of rotation of said element, said pistons engaging said eccentric inner surface of said ring during rotation of said

element for reciprocating the pistons in their cylinders, means for conducting refrigerant fluid from the exterior of said structure to said compressor and means for directing refrigerant from said compressor to said chamber, said members having each an integral portion extending laterally from the cupped portion thereof and providing said structure with a plurality of radiating fins, certain of said members being in intimate heat exchange relation with said housing for transferring heat from said motor to atmosphere exteriorly of said structure, and other of said members being in intimate heat exchange relation with refrigerant discharged from said compressor into said chamber for cooling and liquefying the compressed refrigerant in the chamber.

5. A horizontally disposed combined motor-compressor-condenser-receiver for a closed refrigerating system comprising in combination, a plurality of unidirectionally nested cupped members secured together to form a sealed unitary structure, a portion of said members inwardly of the secured-together cupped portions thereof being perforated to provide an elongated chamber within said structure, a compressor within said chamber, said compressor including an element having oppositely disposed cylinders formed therein and extending perpendicularly to the axis of said horizontally elongated chamber, said compressor element having an integral shaft portion extending therefrom along the axis of said chamber, a motor within said chamber having a rotor mounted on said shaft portion of said compressor element for rotating same, a housing within said chamber for said motor, said housing having bearings mounted therein receiving said shaft portion of said compressor element for supporting same axially of the structure, a piston within each cylinder of said element, a ring surrounding said element and having a cylindrical inner surface disposed eccentric to the axis of rotation of said element, said pistons engaging said eccentric inner surface of said ring during rotation of said element for reciprocating the pistons in their cylinders, means for conducting refrigerant fluid from the exterior of said structure to said compressor and means for directing refrigerant from said compressor to said chamber, said means for directing refrigerant from said compressor including a bore in said shaft portion of said element, said bore communicating at one end with said cylinders and communicating at its other end with a compartment forming a separator for separating oil from refrigerant, said separator forming compartment having openings in its upper portion for the flow of refrigerant therefrom into said chamber, the wall of the perforation in each of certain of said members engaging said housing for supporting said motor axially within said chamber, the wall of the perforation in each of certain other of said members engaging said separator forming compartment for supporting same within said chamber, and said members having each an integral portion extending laterally from the cupped portion thereof and providing said structure with a plurality of radiating fins.

6. A combined motor-compressor-condenser-receiver for a closed refrigerating system comprising in combination, a plurality of unidirectionally nested cupped members secured together to form a sealed unitary structure, a portion of said members inwardly of the secured-together cupped portions thereof being perforated to provide an elongated chamber within said structure, a compressor within said chamber, a motor within said chamber having a rotor directly connected to said compressor for operating same, the wall of the perforation in each of certain of said members engaging said motor and supporting same axially within said chamber, means for conducting refrigerant fluid from the exterior of said sealed structure to said compressor and means for directing refrigerant from said compressor to said chamber, said means for directing refrigerant from said compressor to said chamber including a compartment forming a separator for separating oil from refrigerant, said separator forming compartment having openings in its upper portion for the flow of refrigerant therefrom into said chamber, and said members having an integral portion extending laterally from the cupped portion thereof and providing said structure with a plurality of radiating fins.

7. A combined motor-compressor-condenser-receiver for a closed refrigerating system comprising in combination, a plurality of unidirectionally nested cupped members secured together to form a sealed unitary structure, a portion of said members inwardly of the secured-together cupped portions thereof being perforated to provide an elongated chamber within said structure, a compressor wtihin said chamber, a motor within said chamber having a rotor directly connected to said compressor for operating same, the wall of the perforation in certain of said members engaging said motor and supporting same axially within said chamber, means for conducting refrigerant fluid from the exterior of said sealed structure to said compressor and means for directing refrigerant from said compressor to said chamber, said means for directing refrigerant from said compressor to said chamber including a compartment forming a separator for separating oil from refrigerant, said separator forming compartment having openings in its upper portion for the flow of refrigerant therefrom into said chamber, the wall of the perforation in each of certain of said members engaging said separator forming compartment for supporting same within said chamber, and said members having an integral portion extending laterally from the cupped portion thereof and providing said structure with a plurality of radiating fins for transferring heat from the interior of said chamber to atmosphere exteriorly thereof.

8. A combined motor-compressor-condenser-receiver for a closed refrigerating system comprising in combination, a plurality of unidirectionally nested cupped members secured together to form a sealed unitary structure, a portion of said members inwardly of the secured-together cupped portions thereof being perforated to provide an elongated chamber within said structure, a compressor within said chamber, a motor within said chamber having a rotor directly connected to said compressor for operating same, the wall of the perforation in each of certain of said members engaging said motor and supporting same axially within said chamber, means for conducting refrigerant fluid from the exterior of said sealed structure to said compressor and means for directing refrigerant from said compressor to said chamber, said means for directing refrigerant from said compressor to said chamber including a compartment form-

ing a separator for separating oil from refrigerant, said separator forming compartment having openings in its upper portion for the flow of refrigerant therefrom into said chamber, a conduit extending from said separator forming compartment to said compressor for conveying oil from said compartment to said compressor for lubricating operating parts thereof, the wall of the perforation in each of certain of said members engaging said separator forming compartment for supporting same within said chamber, and said members having an integral portion extending laterally from the cupped portion thereof and providing said structure with a plurality of radiating fins for transferring heat from the interior of said chamber to atmosphere exteriorly thereof.

9. A combined motor-compressor-condenser-receiver for a closed refrigerating system comprising in combination, a plurality of unidirectionally nested cupped members secured together to form a sealed unitary structure, a portion of said members inwardly of the secured-together cupped portions thereof being perforated to provide an elongated chamber within said structure, a compressor within said chamber, a motor within said chamber having a rotor directly connected to said compressor for operating same, the wall of the perforation in each of certain of said members engaging said motor and supporting same axially within said chamber, means for conducting refrigerant fluid from the exterior of said sealed structure to said compressor and means for directing refrigerant from said compressor to said chamber, and said members having an integral portion extending laterally from the cupped portion thereof and providing said structure with a plurality of radiating fins for transferring heat from the interior of said chamber to atmosphere exteriorly thereof.

10. A combined motor-compressor-condenser-receiver for a closed refrigerating system comprising in combination, a plurality of unidirectionally nested cupped members secured together to form a sealed unitary structure, a portion of said members inwardly of the secured together cupped portions thereof being perforated to provide a chamber within said structure, a compressor within said chamber, a motor within said chamber having a rotor connected to said compressor for operating same, at least a part of the wall of the perforation in each of certain of said members engaging said motor and supporting same within said chamber, means for conducting refrigerant fluid from the exterior of said sealed structure to said compressor and means for directing refrigerant from said compressor to said chamber, and the integral portion of each of said certain members intermediate the wall of the perforation and said secured together cupped portion thereof serving to transfer heat from said motor to atmosphere exteriorly of said structure.

11. A combined motor-compressor-condenser-receiver for a closed refrigerating system comprising in combination, a plurality of unidirectionally nested cupped members secured together to form a sealed unitary structure, a portion of said members inwardly of the secured together cupped portions thereof being perforated to provide a chamber within said structure, a compressor within said chamber, a motor within said chamber having a rotor connected to said compressor for operating same, at least a part of the wall of the perforation in each of certain of said members engaging said motor and supporting same within said chamber, means for conducting refrigerant fluid from the exterior of said sealed structure to said compressor and means for directing refrigerant from said compressor to said chamber, the integral portion of each of said certain members intermediate the wall of the perforation and said secured together cupped portion thereof having an aperture therein permitting flow of refrigerant between said members along the length of said chamber, and said intermediate portion of each of said members serving to transfer heat from said motor and the refrigerant within said chamber to atmosphere exteriorly of said structure.

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